effect of these various factors. This is a sort of quantitative analysis, which, though of purely technical interest, would have its value for psychology, could we but be sure of our numerical basis. When unfortunately there are, as in the present instance, three or more variable factors at our disposal, no one of which is a determined function of any other quantity, the field for arbitrary assumption of values is so wide that we have no means of checking our computation.

The real value of the work is that it points out several incidental factors in the process of judging. The more closely actual judgments are studied, the more evident does it become that they do not proceed according to the clean logical schemes which we are prone to devise for them in advance.

R. S. WOODWORTH.

GENERAL.

THE American Museum of Natural History, New York City, proposes to publish a selection of photographs collected by members of the Jesup North Pacific Expedition, provided a sufficient number of subscriptions can be obtained to warrant the undertaking. The photographs are to be reproduced by the heliotype process, in large quarto form. The edition will be limited to 250 copies. It is intended to issue the album in parts of at least 24 plates annually, the whole series to embrace 120 plates. It is contemplated to publish during the first year a series illustrating Indian types from the interior of British Columbia.

THE University of the State of New York has issued Museum Bulletin 24, supplementing the report of the entomologist for 1898, which is a memorial of the life and entomological work of Dr. Lintner. This contains a consolidated index to his whole series of reports and gives a nearly, if not quite, complete list of his scientific contributions during a long series of years. This volume of 316 pages will be sent postpaid to any address for 35 cents. Bulletin 28 is a pamphlet of 202 pages on the plants of North Elba, which will be much appreciated by the frequenters of that beautiful region. Its price postpaid is 20 cents. In University Handbook 16, the State Entomologist explains the scope and public utility of his field of work. This series of handbooks gives in convenient form information frequently called for regarding the various divisions of the university work, and single copies are mailed free to any address.

BOOKS RECEIVED.

The Nervous System and its Constituent Neurones. LEWELLYS F. BARKER. New York, D. Appleton & Co. 1899. Pp. xxxii + 1122.

Chemistry, its Evolution and Achievements. FERDINAND G. WIECHMANN. New York, Jenkins. 1899. Pp. vii + 176.

The Family of the Sun, Conversations with a Child. EDWARD S. HOLDEN. New York, D. Appleton & Co. 1899. Pp. xxiv + 252. 50c.

Handbook of Practical Hygiene. D. H. BERGEY. Easton, Pa., The Chemical Publishing Co. 1899. Pp. 164.

NOTES ON INORGANIC CHEMISTRY.

THE larger works on descriptive chemistry are full of compounds whose existence is doubtful, and it becomes the sometimes thankless task of the chemists of to-day to go over this old work and verify or prove false the work of earlier observers. An instance of this appears in the last *Journal* of the Chemical Society (London) in the case of the suboxid of phosphorus P_4O. The existence of such a compound, discovered by Le Verrier in 1838 was, indeed, called in question by von Schrötter in 1852, as he considered it merely an impure form of the red ('amorphous') phosphorus, which had not long before been discovered by him. In 1880, however, Goldschmidt and Reinitzer prepared a red substance which resembled Le Verrier's 'suboxid' and the existence of P_4O seemed to be confirmed. But now Chapman and Lidbury have gone over the whole subject, have prepared and analyzed every substance which has been described by different observers as 'suboxid' and come to the conclusion that the supposed suboxid P_4O is identical with red phosphorus in a finally divided and superficially somewhat oxidized and hydrated condition. No compound of definite composition could be found.

THE problem of softening hard waters for industrial purposes is one of the great problems of applied chemistry. Such softening is not merely necessary for boiler waters, but it has

been shown recently that the saving in excess of soap consumed by a hard water will render it economical for a city to expend a considerable sum in softening a hard water supply. In a recent number of the *Journal* of the American Chemical Society, M. L. Griffin gives the details of a series of experiments in the use of several softening agents. Waters containing less than .025 grams lime and .007 grams magnesia cannot be appreciably purified, though harder waters can often be reduced below these figures by purification. Calcium carbonate is most effectively removed by sodium hydroxid, sodium fluorid, and in some cases sodium aluminate. Calcium sulfate and chlorid are best treated with sodium fluorid, which, however, has no effect on magnesium salts. Sodium hydroxid is the most useful reagent for magnesium salts, and barium hydroxid follows, but the latter is not satisfactory for waters containing a large proportion of calcium carbonate and sulfate.

In the *Journal* of the Russian Chemical Society a new cerium mineral from the Caucasus is described by G. Tschernik, which from the analysis seems to be essentially a titanate and zirconate of cerium. It contains a gas which is 90% a mixture of nitrogen and argon. The mineral contains but .03% uranium and no helium. The ash of a coal from Tkwibuli, which was chiefly calcium sulfate, with alumina and silica, and about 10% of ceria, lanthana and didymia, showed the presence of over 1% of helium.

The *Report* of the Australian Association for the Advancement of Science contains a description by Thomas Steel of a 'red rain' which fell over Melbourne and much of Victoria on December 27, 1896. The rain carried down an unusually heavy fall of dust of red color, which appeared on analysis to be an ordinary surface soil derived from volcanic rocks. Under the microscope the presence of diatoms, scales of lepidoptera, quartz and garnet were detected.

An instance of the use of liquid ammonia as a solvent is shown by C. Hugot in the *Comptes Rendus*, where the selenids of sodium and potassium are thus formed. A mixture of selenium with the alkali metal is treated with liquid ammonia. If the metal is in excess the insoluble selenid Na_2Se or K_2Se is formed while if the selenium predominates a polyselenid Na_2Se_4 or K_2Se_4 is formed, which is dissolved in the ammonia and is obtained on its evaporation. Contrary to the observation of Franklin and Krauss, Hugot finds that selenium itself is insoluble in liquid ammonia. J. L. H.

TECHNICAL UNIVERSITY DEGREES.

A letter, recently received from Ex-President Andrew D. White, our Minister to Berlin, relative to matters educational, mainly, tells of the festival on the 100th anniversary of the founding of the great technical college at Charlottenburg, Berlin. This celebration, with its processions, its speech-making by the Emperor and other notables, and the structure and decorations of the great college buildings, have been fully described by press correspondents; but it has not been stated, so far as has been observed, except in a brief note in Science, that the Emperor, while erecting this splendid institution into a national, technical, university, making its powers those of the academic universities and its director a '*Rector Magnificus*,' conferred also the special power of giving the degree '*Dr. Ing.*,' doctor of engineering, a degree already established in this country, in 1884, at the initiative of the writer, and very sparingly conferred, to date, by the Stevens Institute of Technology.

The event, both as being the occasion of the formal institution of a national technical university, and as giving formal and official recognition to a degree which gives claim to full standing of the profession of Archimedes and Leonardo and the Marquis of Worcester, beside those of Hippocrates and of Justinian, was one of unusual importance and significance. This movement has been a vitally important part of that systematic programme which has led to the industrial triumph of Germany, of which Dr. White says in this letter: "It is amazing to see how, in their way, the Germans have gone steadily on until they have established a wonderful system of manufacturers all over their country and an astonishing commercial connection, through fleets of great steamers going to all parts of the world."

R. H. Thurston.